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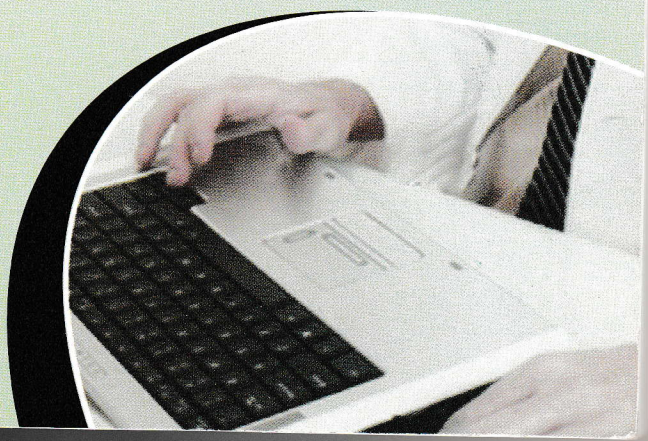
BUILDING INDONESIAN CHARACTERS THROUGH THE DEVELOPMENT OF EARLY, ELEMENTARY, AND SECONDARY EDUCATION

Proceeding 3th International Seminar 2012



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PUSAT KAJIAN DAN PENELITIAN
UNIVERSITAS PENDIDIKAN INDONESIA
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KATA PENGANTAR

Puji syukur tercurah ke hadirat Allah swt. yang telah melimpahkan rahmat dan hidayah-Nya sehingga UPI Kampus Cibiru dapat menyelenggarakan Seminar Internasional yang Ke-3 dengan tema *"Building Indonesian Characters Through the Development of Early, Elementary, and Secondary Education"*. Seminar ini dilaksanakan sebagai sebuah kinerja nyata UPI Kampus Cibiru dalam rangka membangun pendidikan berkarakter, bermutu, dan modern di Indonesia.

Seminar ini secara umum bertujuan secara umum untuk (1) menciptakan wahana untuk berbagi informasi berbagai temuan inovatif dalam menanamkan karakter melalui jalur pendidikan, baik dari akademisi, praktisi, dan orang tua, maupun pemerhati pendidikan anak usia dini; (2) memfasilitasi hadirnya karya-karya inovatif dalam membina calon-calon guru yang mampu secara profesional meningkatkan mutu proses dan hasil pendidikan sekaligus mengembangkan karakter siswa; dan (3) menciptakan peluang untuk membangun kerja sama dalam mewujudkan pendidikan yang berorientasi pendidikan karakter yang berkualitas.

Kegiatan seminar internasional ini menghadirkan beberapa pembicara utama. Para pembicara utama tersebut adalah Dr. Norsiah Fauzan (*Associate Professor at Faculty of Cognitive Science and Human Development, University Malaysia Sarawak*), Dr. Zaharah Binti Hussin (Senior Lecturer at Department of Education Foundation and Humanities, Faculty of Education University of Malaya) dan Abdul Rahman Reijerink (Teacher at Pribadi Advance School Bandung)

Atas terselenggaranya kegiatan ini, terima kasih dan penghargaan kami sampaikan kepada Direktur UPI Kampus Cibiru, Sekretaris Direktur UPI Kampus Cibiru, Ketua Program Studi Pendidikan Guru Sekolah Dasar UPI Kampus Cibiru, Ketua Program Studi Pendidikan Anak Usia Dini UPI Kampus Cibiru, beserta seluruh dosen dan jajaran staf UPI Kampus Cibiru, para penyaji, jajaran panitia, dan peserta seminar atas partisipasinya, bantuan, dan dukungannya sehingga seminar ini dapat dilaksanakan. Akhirnya, semoga seminar dan prosiding seminar ini bermanfaat bagi kita. Amin.

Bandung, November 2012

Panitia

DAFTAR ISI

DEVELOPING STUDENT CHARACTER THROUGH REALISTIC MATHEMATICS LEARNING

Saleh Haji[1]

ABSTRACT

During this study on Realistic Mathematics Learning related to the impact on students' skills in cognitive aspects. This paper will describe developing student caracter through realistic mathematics learning. Realistic mathematics learning can shape the student characters were creative, independent, democratic, and curiosity.

Key words: *Realistic mathematics learning, the students character*

A. INTRODUCTION

In 1970, the Institute for the Development of Mathematics Education (IOWO) led by Hans Freudenthal to develop a mathematical theory of learning mathematics are axiomatic closer to human life. The theory is called the Realistic Mathematics Education (RME). Freudenthal (1991) view that mathematics as a human activity in solving a problem. As a human activity, RME introduced the operation number (+) and minus (-) as passenger and coming down from a trip of a public vehicle (Gravemeijer, 1994).

As a theory, RME has principles and characteristics. The RME principles are: 1) Re-invention and progressive mathematization, 2) didactical phenomenology and 3) Self-developed model (Gravemeijer, 1994). While the RME characteristics are: (1) The use of contexts, (2) The use of models, (3) The use of students 'own productions and constructions and (4) The interactive character of the teaching process, and (5) The intertwinement of various learning strands (De Lange, 1987).

Based on the principles and characteristics of RME, it emphasizes the learning of mathematics are:

1. Using the context of the 'close' to the child, to deliver it to the mathematical formulas are abstract. Contextual Issues may be submitted by teachers and students. Problems kotekstual can build students' retention of knowledge and experience that has had to be used as solve problems or discover new knowledge.
2. Activities students construct their own knowledge through activities horizontal mathematization to vertical. mathematization. Horizontal Mathematization is an activity students present a contextual issues (problems of everyday life) in the form of images (symbols). While vertical mathematization is an activity students in completing mathematical models.
3. Developing reflection and invention activities (re-invention). Reflection activities are a student effort in reviewing the action it has taken to obtain information about the accuracy of the action so that it can be repaired. While the invention (re-invention) is an activity the students in finding the mathematical formula or way of resolving a problem in its own way.
4. Teachers serve as mentors students in gaining the knowledge and means of solving a problem. Teachers guide students in understanding the contextual issues, doing to solve the

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problem is to create a model and how to solve it, and draw conclusions in problem solving and finding concepts / algorithms.

Implementation of realistic mathematics learning for elementary school students have successfully improved mathematics learning outcomes. The results Fauzan (2002), the implementation of RME improve geometry learning outcomes in elementary school. Armanto (2002), the implementation of RME enhance the ability of elementary school students to perform multiplication and division operations. While the results of research Haji (2005), the implementation of RME can enhance students' ability to perform fractional operations.

This paper will examine the impact of RME on the character of the student based on the results of previous studies. Character is attitude or personality are formed from the internalization of many virtues believed and used as the basis for perspective, think, behave, and act (Research and Development in the Curriculum Center in Wijaya, 2012).

B. METHOD

This study used qualitative methods. According Moleong (2010), as a qualitative methodology as the research is produce descriptive data in the form of words written or spoken of the people and behaviors that can be observed. The students behavior were observed to resolve an ongoing issue as realistic mathematics learning in a variety of realistic character studies focused on creative, independent, democratic, and curiosity.

The qualitative methods are carried out through four steps: 1. Data collection, 2. Presentation of data, 3. Data reduction, and 4. Conclusion. Data were collected from a variety of research on RME, and presented in the form of narrative and image, and then classified according to their needs, and final conclusions drawn.

C. RESULTS AND DISCUSSION

The student characters that can be developed through realistic mathematics learning is a creative, independent, democratic, and curiosity. Contextual problem solving can be motivation students creatively with a variety of ways to solve a problem through horizontal and vertical mathematisation. The Student to develop independence in using his own way to solve a problem through the invention. The democratic atmosphere grow through reflection and discussion among students and between students and teachers. The Curiosity awakened from providing contextual issues that challenge students to solve.

1. Creative

Learning based on constructivist theory of realistic mathematics. The essence of this theory explains that students who wish to construct their own knowledge gained. Attempts to understand a concept in mathematics requires creativity. Creative in linking the old knowledge that has been owned by the new knowledge. In addition, creative in arranging a variety of old knowledge to solve a problem. The realistic mathematics learning encourages students to find their own way to solve a problem by conducting invention (re-invention).

The event was at the start of the activity horizontal mathematization to vertical mathematization. Horizontal mathematization is a mathematical activity from non-formal mathematics (real life) to the formal mathematics (symbol). While vertical mathematization is mathematic activities in using the laws of mathematics.

The horizontal mathematic activities require student's creativity in changing in real life problems into a model. The model can be shaped figures, tables or other symbols. While mathematization vertical activities require students' creativity in solve a mathematical model to obtain the correct resolution. The student creativity was demonstrated by the diversity of students in making models of the nets following a tube (Kesumawati, 2010):

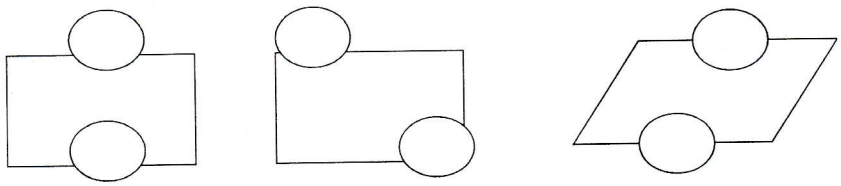
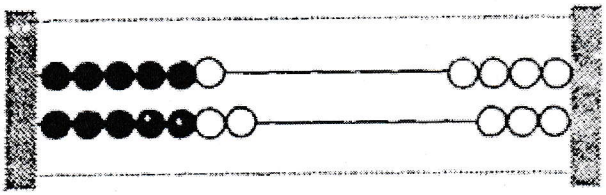


Figure 1 Model of tube

For 4 days in a row, Andy was able to read the book as much as 32 pages per day. How many pages of books read during the four-day Andi (Haji, 2005).

a. 32x4=4+4+4+4+4+4+4+4+4+4+4+4+4+4+4+4+4+4+4+4+4+4+4+4+4+4+4+4+4+4+4+4 = 128
b. 32x4 = 32+32+32+32 = 128
c. 32x4 = 30+30+30+30+2+2+2+2 = 128

Treffers (1990) find ways children presented the following results 6 +7 6 +7 = 6 +6 + 1, or 6 +7 = 5 ÷ 5 + 1 +2 (Gambar 2).



Figur 2 sixt plus sevent

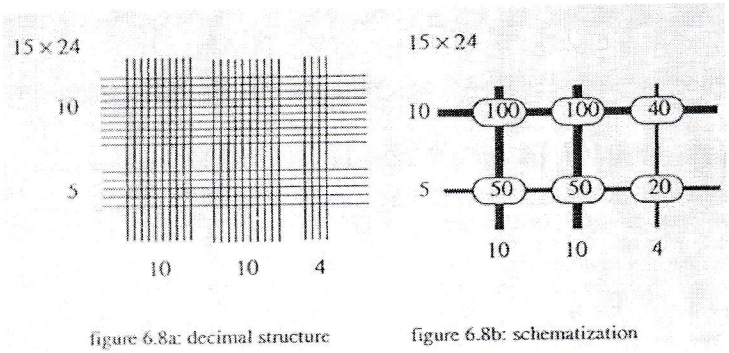


figure 6.8a: decimal structure figure 6.8b: schematization

2. Independently

Each student uses their own way to solve a problem by independently. The independence of the students in solving the problem lies in the activities using prior knowledge to understand problem, create a model for the problem, and determine the solution.

The independence of students in determining a means of solving a problem is indicated by the following case. Ter Heege (1983) and Streefland (1988), has been the cause of awareness that children themselves create good alternative solution procedures,

Research shows that children can spontaneously come up with a number of informal strategies to get the basic facts of addition and subtraction (Groenewegen and Gravemeijer, 1988).

Realistic mathematics learning puts students in a position quite different from the traditional educational approach that students should be more independent. A tailor can finish a piece of shirt for 6.5 hours. If he receives an order 3 pieces of shirts, how many minutes, the time it takes to complete that order (Lambertus, 2010)?

The student answer A: 6,5 jm + 6,5 jm + 6,5 jm

The student answer B: 6 jam + 30 menit
6 jam + 30 menit
6 jam + 30 menit
\+
18 jam + 90 menit
18 jam = 18 x 60 menit = 1080 menit
So 1080 + 90 = 1170 menit

3. Democratic

The problem solving way is done in a democratic manner. Each student has the freedom to communicate mathematical ideas through interactivity. Wijaya (2012) argued that interactivity in realistic mathematics learning can build the students character. Activities interactivity occurs when the students do variety solution solving a problem is discussed in a democratic way in determining the right way.

Freudenthal (1973) have shown that children develop a sequence of numbers in a democratic context presented through age 2 brothers who Andi and Diyah. Andi is sevent year old Andi said to his brother (Diyah) who was 2 years older. "When I was 9 years old, you're 11 years old, when I was 11 years old, you're 13 years; .....". Another context in determining the number before number 15. There are students who say the number 8. Another student said the number 13. Others say number 2. Van den Brink (1974), using the number line to instill the concept of addition and subtraction. The democratically in determining solving a problem is indicated in the following cases.

Suatu wadah berisi 10 buah bola yaitu 3 buah bola berwarna merah dan 7 buah bola berwarna putih. Bola mana yang memiliki peluang terkecil dan terbesar dengan sekali pengambilan (Sugiman, 2010)?

An urn contains 10 balls is 3 red balls and 7 white balls. Which ball has the smallest and the biggest opportunity with one decision (Sugiman, 2010)?

Shg: Menurut saya peluang terambil bola merah yang terkecil adalah bola merah, karena terdapat 3 buah bola merah, sedangkan yang terbesar adalah terambilnya bola putih, karena terdapat 7 buah bola putih.
Shg: I think probability the smallest red ball drawn was red ball, because there are 3 red balls, while the largest is drawing a white ball, because there are 7 white balls.
TRF: It seems not that easy, because the number of balls in each container are not the same.
Shg: And then what?
Bud: Perhaps we could mimic the way to answer the previous question.

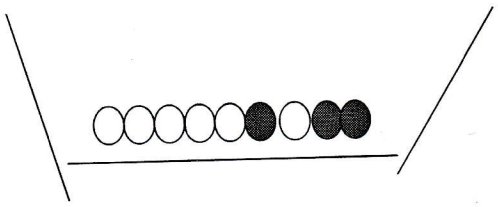


Figure 3 Balls

The Ali has Rp. 10.000. - It takes two different objects for the purpose of studying mathematics. Any item to be purchased by the Ali is (Haji, 2005).

Siswa A : Beli 1 buah pulpen seharga Rp. 3.000.- dan 1 buah buku tulis seharga Rp. 7.000.-
Guru : Benar, bagus! Ada yang lain?
Siswa B : Saya Pak! Beli 1 buah map seharga Rp. 5.000.- dan 1 buah penggaris seharga Rp. 5.000.-
Guru : Benar, bagus! Ada yang lain?
Student A: Buy 1 piece pens is Rp. 3,000. - and one of the books is Rp. 7,000. - Teacher: Yes, great! Anyone else?
Student B: I, sir! Buy 1 map is Rp. 5,000. - And 1 ruler is Rp. 5,000. –
Teacher: Yes, great! Anyone else?

4. Curiosity

The contextual problems is presented by the teacher through realistic mathematics learning should be an interesting and provoke a sense of curiosity a students to complete. Students' sense of curiosity in understanding the problem, how the settlement, and the final settlement. Activities that demonstrate curiosity is expressed in the form of a persistent effort in understanding and to solve problems, asking questions and expressing an opinion to his friends and teachers.

Student curiosity in determining two numbers where the relationship to the two numbers are known. As the following case. Given two different numbers is 12 and 3 times the larger number equal to 9 times the smaller number. What are those numbers (Purwanto, 2010)? Answer the following students:

A – b = 12
18 – b = 12
3 a = 9 b

3 (18) = 9 (6)
54 = 54
So the numbers a and b are 18 & 6.

Pak Somat rectangular shaped courtyard with a width of 6 m. Throughout the 2 m he planted grass Japan, 4 m he planted with paper flowers and the rest xm he made pond. While Mr. Tamos shaped rectangle with a width of 4 m. Throughout the 2 m he planted grass Japan, 6 m he planted with flowers and the rest of his paper he made pond ym. Can you determine who is the most yard wide (Hasratuddin, 2010)

G: Who courtyard wider?
KS: Mr. Somat
G: Oh yeah? How much wider Mr. Somat yard?
KS: 4 meters
G: How did you know?
KS: Spacious yard Mr. Somat 72 meters, spacious yard Mr Tamos 76 meters. So more extensive grounds Mr. Somat 4 meters, which is 76 meters - 72 meters, sir.
G: Oh yeah? How had extensive grounds Mr. Somat?
KS: Oh, yes, sir. Wrong. Broader Tamos pack yard, 4 yards.

Observe cake box below. Make a model of the object. Write down the number and shape of the field, the number and length of ribs, the number of vertices, and the angles formed by the ribs (Saragih, 2011).

a. How large is the family mother Henny?
b. How much does it cost to buy a rug mother Henny two spaces?

Students solve it by using a model of the form of images.

Muhsin want to make a clone brother mosque dome shape made of plywood as shown above. To make it look like real. Muhsin make the size of the artificial dome with long edges together which is 15 cm. At home depot Muhsin get ex rectangular plywood ribs length 30 cm. Discuss with your friends to address the following issues. Check if the plywood is enough to make the Cuban? How many pieces of plywood are needed Muhsin? Determine the size and shape and cut (Nursyamsi, 2010)?

Student response: Yes, 5 pieces of plywood, 4 equilateral shape and size 1persegi side = 15 cm. Student response was accompanied by an image modeling rectangular with sides of 30 cm, in which an image contains a small square, triangular and trapezoidal.

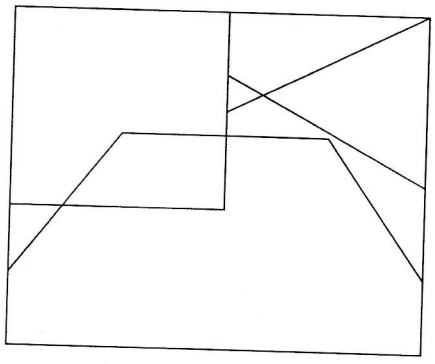


Figure 4 Rectangular

Dr. Wizard has found a group of monsters who live in a dark cave in South America. He has counted seven monsters, and there are eight fingers on each monster. If there are four fingers on each hand monster, monster hand what he found?

Focus on model the general solution caused him to overlook a simple solution: from the number of fingers, you conclude that there are twice as many hands of monsters, then 2 x 7 = 14 hand monster (Shalin in Greeno, 1987). Treffers, De Moor and Feijs (1989) lists the following examples for the division 26 ÷ 4: 26 passengers had to be transported by car. Each car can carry 4 passengers. How many cars will be needed.

D. CONCLUSION

The realistic mathematics learning can develop character of students who are creative, independent, democratic, and curiosity. Creative in a variety of ways to settle a problem. Independent in solving the problem in his own way. Democratic convey mathematical ideas through discussion. Curiosity grew by providing contextual issues that challenge.

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